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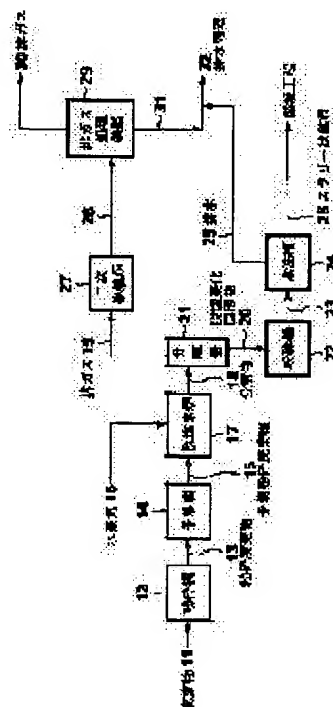
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(54) METHOD FOR DECHLORINATION OF WASTE AND METHOD AND APPARATUS FOR PRODUCING DECHLORINATED FUEL

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a method for the dechlorination of waste in which organic chlorine compounds are not generated, and the amount of generated waste such as a gasification residue and combustion ash can be controlled and a method and an apparatus for producing dechlorinated fuel.

SOLUTION: An apparatus is constituted from a crusher 12 for crushing waste 11 containing chlorine into particles of a prescribed size or below, a preheater 14 for preheating the crushed waste 13, a dechlorination furnace 17 for dechlorination by heating in a high concentration of steam introduced from a steam introduction means 16, a separator 21 for separating pyrolysate 18 into exhaust gas 19 and dechlorinated solids 20, a crusher 22 for crushing the solids 20 into particles of a prescribed size or below, and a water-washing tank 24 which washes the crushed dechlorinated solids 23 with water and removes inorganic salts. The waste 11 is dechlorinated, excess water of slurry after being



washed with water in the tank 24 is removed as drainage 25 in order to obtain dechlorinated slurry fuel 26.

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CLAIMS

[Claim(s)]

[Claim 1] The dechlorination approach of the trash characterized by consisting of a rinsing process which rinses this dechlorination solid made detailed the separation process which separates the dechlorination process which dechlorinates while pyrolyzing the trash containing chlorine, and a dechlorination solid and cracked gas, and a detailed chemically-modified [which grinds and makes detailed the separated dechlorination solid] degree, and removes mineral salt.

[Claim 2] The dechlorination approach of the trash characterized by having the grinding process which grinds and carries out grain refining of the trash which contains chlorine in the preceding paragraph of a dechlorination process in claim 1, and is used as grain-refining trash.

[Claim 3] The dechlorination approach of the trash characterized by being in claim 1 or 2 about the desiccation process which dries the dechlorination solid after rinsing after the above-mentioned rinsing process.

[Claim 4] The dechlorination approach of the trash characterized by dechlorinating in the above-mentioned dechlorination process in claim 1 thru/or 3, introducing a steam, and preventing inorganic chlorination of chlorine.

[Claim 5] The dechlorination approach of the trash characterized by processing under reduced pressure in the above-mentioned dechlorination process in claim 1 thru/or 4.

[Claim 6] The dechlorination approach of the trash characterized by having the preheating process which heats beforehand the trash ground between the above-mentioned grinding process and the dechlorination process in claim 1 thru/or 5.

[Claim 7] The dechlorination approach of the trash characterized by having the elevated-temperature combustion process which burns the cracked gas separated at the above-mentioned separation process at a secondary combustion furnace in claim 1 thru/or 6, and the offgas treatment process which removes the chlorine in exhaust gas.

[Claim 8] The dechlorination approach of the trash characterized by having the heat exchange process which carries out heat exchange of the exhaust heat of gas between the above-mentioned elevated-temperature combustion process and an offgas treatment process in claim 1 thru/or 7.

[Claim 9] The dechlorination approach of the trash which the above-mentioned heat exchange process introduces air, considers as heating air in claim 8, and is characterized by using this heating air for heating of the above-mentioned dechlorination process.

[Claim 10] The dechlorination approach of trash that the above-mentioned heat exchange process has the steamy generating process of generating a steam using exhaust heat, and is characterized by using the generated steam for heating of the above-mentioned dechlorination process in claim 8.

[Claim 11] The dechlorination approach of the trash which has the steamy generating process that the above-mentioned heat exchange process generates a steam using exhaust heat, and is characterized by using a heat process as a heat source of a desiccation process further beforehand in claim 8 while using the generated steam for the above-mentioned dechlorination process.

[Claim 12] The dechlorination approach of the trash characterized by performing a pyrolysis process by

direct heat-treatment or indirect heating processing in claim 1.

[Claim 13] The dechlorination approach of the trash characterized by performing decomposition temperature of a pyrolysis process at 300-450 degrees C in claim 1.

[Claim 14] The dechlorination approach of the trash characterized by grinding grinding of the above-mentioned grinding process to 20mm or less in claim 1.

[Claim 15] The dechlorination approach of the trash characterized by grinding grinding of a detailed chemically-modified [above-mentioned] degree to 10mm or less in claim 1.

[Claim 16] The dechlorination approach of the trash characterized by making preheat temperature of the above-mentioned preheating process into 200-300 degrees C in claim 6.

[Claim 17] The dechlorination approach of the trash which makes combustion temperature of an elevated-temperature combustion process 750-1000 degrees C, and is characterized by burning at least 2 seconds or more in claim 7.

[Claim 18] The dechlorination approach of the trash characterized by circulating the gas by which an oxygen density does not contain low gas or oxygen in claim 12 when a dechlorination process is direct heat-treatment.

[Claim 19] The manufacture approach of the dechlorination fuel characterized by draining off water from the slurry object rinsed at the rinsing process of claim 1, and obtaining a slurry-like dechlorination fuel.

[Claim 20] The manufacture approach of the dechlorination fuel characterized by drying at the desiccation process of claim 3 and obtaining a dechlorination solidification fuel.

[Claim 21] The manufacturing installation of the dechlorination fuel which carries out [obtaining a slurry-like dechlorination fuel from the trash which consists of the eliminator which separates the grinder which grinds the trash containing chlorine, the dechlorination furnace which dechlorinates while heating and pyrolyzing this grain-refining trash, and a dechlorination solid and cracked gas, a grinder which grind and make detailed the separated dechlorination solid, and a rinse tank from which the this ground dechlorination solid rinses and mineral salt removes, and contains chlorine, and] as the description.

[Claim 22] The manufacturing installation of the dechlorination fuel characterized by obtaining a slurry-like dechlorination fuel from the refuse-derived fuel (RDF) which consists of the eliminator which separates the dechlorination furnace which dechlorinates while pyrolyzing a refuse-derived fuel (RDF), and a dechlorination solid and cracked gas, a grinder which makes detailed the separated dechlorination solid, and a rinse tank from which the this ground dechlorination solid is rinsed and mineral salt is removed, and contains chlorine.

[Claim 23] The manufacturing installation of the dechlorination fuel characterized by obtaining a dechlorination solid fuel from the trash which has the desiccation process which dries the dechlorination solid after rinsing after the above-mentioned rinsing process in claim 21 or 22, and contains chlorine.

[Claim 24] The manufacturing installation of the dechlorination fuel characterized by forming a steam installation means in a dechlorination furnace in claim 21 or 22.

[Claim 25] The manufacturing installation of the dechlorination fuel characterized by establishing a reduced pressure means to decompress the inside of a dechlorination furnace, in claim 21 or 22.

[Claim 26] The manufacturing installation of the dechlorination fuel characterized by pivotable or enabling stirring of the interior of a furnace of the dechlorination furnace itself in claim 21 or 22.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] this invention -- NaCl and MgCl₂ etc. -- the plastics mixture containing the plastics containing the chlorine discharged from the home containing an inorganic chlorine compound, such as a common contaminant and a vinyl chloride, -- [for example,] In processing of trash, such as car shredder dust containing the plastics containing chlorine or a mineral constituent Harmful organochlorine compounds, such as dioxin, are not generated and it is related with the manufacture approach of a dechlorination fuel and equipment which use effectively the dechlorination approach list processing product of the trash which can control the yield of trash, such as gasification residue and combustion ashes, further.

[0002]

[Description of the Prior Art] In recent years, the trash containing the plastics mixture and the mineral constituent containing the plastics containing chlorine, such as a polyvinyl chloride and a polyvinylidene chloride, is discharged so much, and the increment also of the amount of abandonment is being enhanced. The present condition is that the greater part of such trash carries out incineration disposal as it is, or the landfill is carried out.

[0003] When incineration disposal is carried out, harmful matter generated in the case of incineration, such as a hydrogen chloride and dioxin, may be emitted to atmospheric air as they are. Moreover, when a landfill is carried out, since the active principle in trash is not used, it becomes loss of a resource. Then, collecting the active principles in it is proposed by pyrolyzing these trash.

[0004] However, chlorine compounds, such as a hydrogen chloride and chlorine gas, are generated in large quantities by the pyrolysis, gasification, or combustion of the plastics containing the chlorine in trash, and this not only causes a serious public nuisance, but causes the corrosion of a pyrolysis furnace, a gasifier, or a combustion furnace. Then, in order to remove a chlorine compound by pretreating these trash, the approach the indirect heating at a heat carrier, a heater, etc. performed a pyrolysis in a decomposition tub was proposed.

[0005] By this approach, since homogeneity heating of the solid-state inside a cracking unit is difficult, the parts softened and fused [especially] by local heating with thermoplastics weld, and it becomes massive, and is left in the plastics which the non-decomposed hydrogen chloride fused, and this hydrogen chloride cannot be removed completely. Moreover, as alkali metal compounds, such as calcium, Na, and K, were added in these trash and a pyrolysis and by making it gasify or burn showed to following "*** 1", the approach of removing as chlorine compounds (CaCl₂, NaCl, KCl, etc.) with alkali metal was proposed.

[0006]

[Formula 1]

calcium(OH)₂ + 2HCl -> CaCl₂ + 2H₂O -- (1)

CaCO₃ + 2HCl -> CaCl₂ + H₂O + CO₂ -- (2)

NaOH + HCl -> NaCl + H₂O -- (3)



[0007] However, hydrogen chloride HCl generated from trash In order to make the whole quantity react with alkaline metals and to decompose as a chlorine compound, in consideration of conversion, the alkaline metals more than about 4 time equivalence were added by the former. Consequently, in order to add superfluous alkaline metals, a lot of residue was discharged and it was a problem.

[0008] Moreover, when processing again the residue containing the chlorine compound metallurgy group which carried out the byproduction with a melting furnace etc. and collecting metals after pretreating the trash which contains metals, such as car shredder dust, by this approach, these chlorine compounds are in a melting condition at elevated temperature about 750 degrees C or more, and there is also a problem that this disperses as Myst and causes corrosion in contact with a metal. By the approach of burning the trash which contains a lot of chlorine especially as it is, and adding an alkali metal compound to this, the amount of the chlorine compound which carries out a byproduction also increases, and the problem of the corrosion by melt also becomes large.

[0009] Furthermore, since the heavy metal of a minute amount is contained as a plasticizer, a stabilizer, or a coating in plastics, there is a problem in carrying out disposal of the part for such combustion residue as it is.

[0010]

[Means for Solving the Problem] Invention of the [claim 1] of this invention which solves the aforementioned technical problem is characterized by to consist of a rinsing process which rinses this dechlorination solid made detailed the separation process which separates the dechlorination process which dechlorinates while pyrolyzing the trash containing chlorine, and a dechlorination solid and cracked gas, and a detailed chemically-modified [which grinds and makes detailed the separated dechlorination solid] degree, and removes mineral salt.

[0011] Invention of [claim 2] is characterized by having the grinding process which grinds and carries out grain refining of the trash which contains chlorine in the preceding paragraph of a dechlorination process, and is used as grain-refining trash in claim 1.

[0012] Invention of [claim 3] is characterized by being about the desiccation process which dries the dechlorination solid after rinsing after the above-mentioned rinsing process in claim 1 or 2.

[0013] In claim 1 thru/or 3, in the above-mentioned dechlorination process, it is dechlorinated invention of [claim 4] introducing a steam, and is characterized by preventing inorganic chlorination of chlorine.

[0014] Invention of [claim 5] is characterized by processing under reduced pressure in the above-mentioned dechlorination process in claim 1 thru/or 4.

[0015] Invention of [claim 6] is characterized by having the preheating process which heats beforehand the trash ground between the above-mentioned grinding process and the dechlorination process in claim 1 thru/or 5.

[0016] Invention of [claim 7] is characterized by having the elevated-temperature combustion process which burns the cracked gas separated at the above-mentioned separation process at a secondary combustion furnace, and the offgas treatment process which removes the chlorine in exhaust gas in claim 1 thru/or 6.

[0017] Invention of [claim 8] is characterized by having the heat exchange process which carries out heat exchange of the exhaust heat of gas between the above-mentioned elevated-temperature combustion process and an offgas treatment process in claim 1 thru/or 7.

[0018] In claim 8, the above-mentioned heat exchange process introduces air, and invention of [claim 9] considers as heating air, and is characterized by using this heating air for heating of the above-mentioned dechlorination process.

[0019] Invention of [claim 10] is characterized by having the steamy generating process that the above-mentioned heat exchange process generates a steam using exhaust heat, and using the generated steam for heating of the above-mentioned dechlorination process in claim 8.

[0020] In claim 8, invention of [claim 11] is characterized by using a heat process as a heat source of a desiccation process further beforehand while it has the steamy generating process that the above-mentioned heat exchange process generates a steam using exhaust heat and uses the generated steam for

the above-mentioned dechlorination process.

[0021] It is characterized by invention of [claim 12] performing a pyrolysis process by direct heat-treatment or indirect heating processing in claim 1.

[0022] It is characterized by invention of [claim 13] performing decomposition temperature of a pyrolysis process at 300-450 degrees C in claim 1.

[0023] Invention of [claim 14] is characterized by grinding grinding of the above-mentioned grinding process to 20mm or less in claim 1.

[0024] Invention of [claim 15] is characterized by grinding grinding of a detailed chemically-modified [above-mentioned] degree to 10mm or less in claim 1.

[0025] Invention of [claim 16] is characterized by making preheat temperature of the above-mentioned preheating process into 200-300 degrees C in claim 6.

[0026] In claim 7, invention of [claim 17] makes combustion temperature of an elevated-temperature combustion process 750-1000 degrees C, and is characterized by burning at least 2 seconds or more.

[0027] In claim 12, invention of [claim 18] is characterized by circulating the gas by which an oxygen density does not contain low gas or oxygen, when a dechlorination process is direct heat-treatment.

[0028] Invention of the manufacture approach of the dechlorination fuel of [claim 19] drains off water from the slurry object rinsed at the rinsing process of claim 1, and is characterized by obtaining a slurry-like dechlorination fuel.

[0029] It dries at the desiccation process of claim 3, and invention of [claim 20] is characterized by obtaining a dechlorination solidification fuel.

[0030] Invention of the manufacturing installation of the dechlorination fuel of [claim 21] The grinder which grinds the trash containing chlorine, and the dechlorination furnace which dechlorinates while heating and pyrolyzing this grain-refining trash, It consists of the eliminator which separates a dechlorination solid and cracked gas, a grinder which grinds and makes detailed the separated dechlorination solid, and a rinse tank from which the this ground dechlorination solid is rinsed and mineral salt is removed, and is characterized by obtaining a dechlorination fuel from the trash containing chlorine.

[0031]

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[0005] By this approach, since homogeneity heating of the solid-state inside a cracking unit is difficult, the parts softened and fused [especially] by local heating with thermoplastics weld, and it becomes massive, and is left in the plastics which the non-decomposed hydrogen chloride fused, and this hydrogen chloride cannot be removed completely. Moreover, as alkali metal compounds, such as calcium, Na, and K, were added in these trash and a pyrolysis and by making it gasify or burn showed to following "*** 1", the approach of removing as chlorine compounds (CaCl₂, NaCl, KCl, etc.) with alkali metal was proposed.

[0006]

[Formula 1]

$$\text{calcium(OH)}_2 + 2\text{HCl} \rightarrow \text{CaCl}_2 + 2\text{H}_2\text{O} \quad \text{-- (1)}$$

$$\text{CaCO}_3 + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2 \quad \text{-- (2)}$$

$$\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O} \quad \text{-- (3)}$$



[0007] However, hydrogen chloride HCl generated from trash In order to make the whole quantity react with alkaline metals and to decompose as a chlorine compound, in consideration of conversion, the alkaline metals more than about 4 time equivalence were added by the former. Consequently, in order to add superfluous alkaline metals, a lot of residue was discharged and it was a problem.

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[0011] Invention of [claim 2] is characterized by having the grinding process which grinds and carries out grain refining of the trash which contains chlorine in the preceding paragraph of a dechlorination process, and is used as grain-refining trash in claim 1.

[0012] Invention of [claim 3] is characterized by being about the desiccation process which dries the dechlorination solid after rinsing after the above-mentioned rinsing process in claim 1 or 2.

[0013] In claim 1 thru/or 3, in the above-mentioned dechlorination process, it is dechlorinated invention of [claim 4] introducing a steam, and is characterized by preventing inorganic chlorination of chlorine.

[0014] Invention of [claim 5] is characterized by processing under reduced pressure in the above-mentioned dechlorination process in claim 1 thru/or 4.

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[0017] Invention of [claim 8] is characterized by having the heat exchange process which carries out heat exchange of the exhaust heat of gas between the above-mentioned elevated-temperature combustion process and an offgas treatment process in claim 1 thru/or 7.

[0018] In claim 8, the above-mentioned heat exchange process introduces air, and invention of [claim 9] considers as heating air, and is characterized by using this heating air for heating of the above-mentioned dechlorination process.

[0019] Invention of [claim 10] is characterized by having the steamy generating process that the above-mentioned heat exchange process generates a steam using exhaust heat, and using the generated steam for heating of the above-mentioned dechlorination process in claim 8.

[0020] In claim 8, invention of [claim 11] is characterized by using a heat process as a heat source of a desiccation process further beforehand while it has the steamy generating process that the above-mentioned heat exchange process generates a steam using exhaust heat and uses the generated steam for

the above-mentioned dechlorination process.

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[0025] Invention of [claim 16] is characterized by making preheat temperature of the above-mentioned preheating process into 200-300 degrees C in claim 6.

[0026] In claim 7, invention of [claim 17] makes combustion temperature of an elevated-temperature combustion process 750-1000 degrees C, and is characterized by burning at least 2 seconds or more.

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[0028] Invention of the manufacture approach of the dechlorination fuel of [claim 19] drains off water from the slurry object rinsed at the rinsing process of claim 1, and is characterized by obtaining a slurry-like dechlorination fuel.

[0029] It dries at the desiccation process of claim 3, and invention of [claim 20] is characterized by obtaining a dechlorination solidification fuel.

[0030] Invention of the manufacturing installation of the dechlorination fuel of [claim 21] The grinder which grinds the trash containing chlorine, and the dechlorination furnace which dechlorinates while heating and pyrolyzing this grain-refining trash, It consists of the eliminator which separates a dechlorination solid and cracked gas, a grinder which grinds and makes detailed the separated dechlorination solid, and a rinse tank from which the this ground dechlorination solid is rinsed and mineral salt is removed, and is characterized by obtaining a dechlorination fuel from the trash containing chlorine.

[0031] Invention of the manufacturing installation of the dechlorination fuel of [claim 22] consists of the eliminator which separates the dechlorination furnace which dechlorinates while pyrolyzing a refuse-derived fuel (RDF), and a dechlorination solid and cracked gas, a grinder which makes detailed the separated dechlorination solid, and a rinse tank from which the this ground dechlorination solid is rinsed and mineral salt is removed, and is characterized by obtaining a dechlorination fuel from the refuse-derived fuel (RDF) containing chlorine.

[0032] In claim 21 or 22, invention of [claim 23] has the desiccation process which dries the dechlorination solid after rinsing after the above-mentioned rinsing process, and is characterized by obtaining a dechlorination solid fuel from the trash containing chlorine.

[0033] Invention of [claim 24] is characterized by forming a steam installation means in a dechlorination furnace in claim 21 or 22.

[0034] Invention of [claim 25] is characterized by establishing a reduced pressure means to decompress the inside of a dechlorination furnace in claim 21 or 22.

[0035] Invention of [claim 26] is characterized by pivotable or enabling stirring of the interior of a furnace of the dechlorination furnace itself in claim 21 or 22.

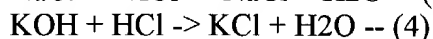
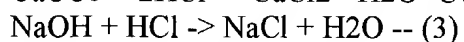
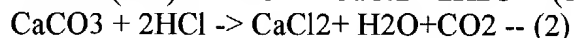
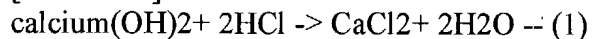
[0036] This invention explains the outline of the main specific matters of aforementioned The means for solving a technical problem below.

[0037] 1) Establish a detailed process after a dechlorination process. At the dechlorination process by the pyrolysis, by making into a hydrogen chloride more than abbreviation 80wt% of the chlorinity contained in trash, a dechlorination and in order to dissociate, in the solid after dechlorination, the chlorine not more than abbreviation 20wt% of the chlorine contained at the beginning remains. This residual chlorine reacts with the alkaline metals contained in trash (following reaction-formula [which is shown in "*** 2"] (1) - (4)), and generates a chloride. Since the melting point is about 700-850 degrees C, this chloride is fused at gasification or a combustion process, serves as Myst, it is said-**(ed) in gas,

is solidified in the low-temperature section of a back process, and becomes causes, such as corrosion.

[0038]

[Formula 2]



[0039] Then, the solid separated after the dechlorination process is rinsed and it was made to dissolve and separate a chloride meltable in water in this invention. Since the chloride is contained also inside the solid at this time, after establishing a detailed process, carrying out grinding processing of the solid and making it the diameter of detailed, the cleaning effect has been heightened by carrying out rinsing processing. It is better for 1-5mm or less to cost 10mm or less preferably as a grinding particle size made detailed here.

[0040] 2) Perform a pyrolysis in a steam ambient atmosphere in a dechlorination process. In the case of a steam ambient atmosphere, in pyrolysis dechlorination, the reverse reaction of said reaction-formula (1) - (4) occurs. So, in this invention, the gas containing a steam is used as gas for a purge supplied to the dechlorination furnace into which trash was put. At this time, the higher one of steam concentration is desirable. In addition, a steam can be supplied by using the exhaust heat in the art of this invention effectively.

[0041] 3) Carry out reduced pressure processing of the interior of a furnace in a dechlorination process. HCl decomposed in pyrolysis dechlorination Gas reacts with the metals contained in trash, and carries out the byproduction of the chlorine compound. Then, it is HCl by carrying out reduced pressure processing of the inside of the dechlorination furnace into which trash was put, in order to prevent this in this invention. The diffusion rate to the outside of the system of gas is made to increase.

[0042] 4) Prepare an agitator style in the interior of a furnace in a dechlorination process. In order to control that the nodule of the waste plastic softened and fused with heating generates as a internal structure of a pyrolysis dechlorination furnace, in this invention, an agitator style is prepared in the interior of a furnace. Moreover, HCl generated in the pyrolysis according to this device Gas can be efficiently diffused and deaerated from the interior of a layer of trash.

[0043] 5) Establish the device in which the furnace itself is rotated, in a dechlorination process. By rotating the dechlorination furnace which holds trash, it has the effectiveness of making it exfoliating by the particle of the trash which moves the wall surface affix of the high-boiling point component generated by the pyrolysis.

[0044]

[Embodiment of the Invention] Hereafter, although the gestalt of operation of this invention is explained, this invention is not limited to this.

[0045] With the gestalt of [gestalt of the 1st operation] book operation, after carrying out the pyrolysis dechlorination of the trash containing chlorine, while obtaining a dechlorination fuel by dissolving the mineral salt ghost which once rinsed and carried out the byproduction in water, and dissociating, it is made to dechlorinate trash. Moreover, the fuel dechlorinated by this processing can be obtained. Furthermore, without being accompanied by the failure by the chloride as a fuel of that blasting-fumes-izing or a combustion process, combustion processing of this obtained dechlorination fuel can be carried out, and it enables clean processing without generating of the harmful matter in that case, for example, dioxin.

[0046] Drawing 1 is the outline of equipment of dechlorinating the trash concerning the gestalt of the 1st operation. Moreover, this equipment is also the outline of the manufacturing installation of a dechlorination fuel. The grinder 12 which carries out grain refining of the trash 11 containing chlorine to below predetermined size (for example, 20mm or less) as shown in drawing 1, The preheater 14 which heats the ground trash 13 beforehand, and the dechlorination furnace 17 which dechlorinates by heating the trash 15 by which the preheating was carried out, and by which grain refining was carried out in the condition that the steam concentration introduced from the steam installation means 16 is high, The

eliminator 21 which divides the decomposition product 18 by which the pyrolysis was carried out at the above-mentioned dechlorination furnace into exhaust gas 19 and the dechlorinated solid 20, It consists of a grinder 22 which carries out pulverization (5mm or less) of the separated dechlorination solid 20 to below predetermined size, and a rinse tank 24 from which the dechlorination solid 23 made detailed is rinsed, and mineral salt is removed, and trash 11 is dechlorinated. Moreover, the above-mentioned rinse tank 24 removes the excessive moisture of the slurry object after rinsing as wastewater 25, and the slurry-like fuel 26 which is a dechlorination fuel is obtained.

[0047] In the HCl absorption tower which full decomposition of the aromatic series chlorine compound in gas etc. is carried out because the exhaust gas 19 separated with the above-mentioned eliminator 21 burns at an elevated temperature at the secondary combustion furnace 27, combustion gas 28 is cooled after that at an elevated temperature, and is offgas treatment equipment 29 Chlorine gas is removed, it is discharged outside as exhaust gas 30, and, on the other hand, the wastewater 31 which absorbed chlorine gas is processed with the waste-water-treatment facility 32 with the wastewater from the above-mentioned rinse tank 24.

[0048] Here, in order to promote dechlorination, it is not necessary to carry out melting of the above-mentioned preheater 14, and it is not necessary to form it especially depending on the contents of trash 11. Moreover, you may make it form a preheating means in the dechlorination furnace 17 at one. Namely, what is necessary is to make the inlet-port part of the dechlorination furnace 17 into the preheating section, and just to lengthen the need die length of the dechlorination furnace 17, in supplying the next dechlorination furnace 17, without passing through a preheater 14. What is necessary is just to make preheat temperature of the above-mentioned preheater 14 into 250-degree-C order preferably that what is necessary is just to consider as about 200-300 degrees C.

[0049] Here, the following examples are given as trash 11 containing chlorine.

** NaCl and MgCl₂ etc. -- contaminant discharged from the home which the plastics containing an inorganic chlorine compound or chlorine mixed.

** Plastics mixture containing the plastics containing chlorine, such as a vinyl chloride.

** The so-called car shredder dust which uses plastics after removing the metals of an automobile as a principal component (it is called "CSD" below Car Shredder Dust :.).

[0050] the inside of the common contaminant discharged from a home -- chlorine -- about 1 -- about - 3wt% -- it is contained. moreover -- the inside of the plastic waste discharged from the home currently collected separately in some areas -- chlorine -- about 2 -- about -5wt% -- it is contained. the example of a component of CSD is as follows, and a polyvinyl chloride (PVC) uses it as an electric wire for instrumentation -- having -- **** -- the inside of CSD -- as chlorine -- about 0.5 to 5 wt% -- it is contained.

[0051]

[Table 1]

カーシュレッダーダストCSDの成分例

プラスチック	51.8wt%
ゴム類	6.8
金属類	7.1
ガラス	7.3
木質類	5.2
その他（砂，無機物）	21.8

[0052]

[Table 2]

C S D中のプラスチック類の内訳例

ポリプロピレン	21.6wt%
A B S樹脂	21.4
ポリウレタン	15.9
ポリスチレン	12.1
P V C	11.1
ポリエチレン	9.0
アクリル樹脂	3.1
ユリア樹脂	2.0
ポリ塩化ビニリデン	1.2
その他	2.6

[0053] Although grain refining of the above-mentioned trash 11 is carried out with the grinder 12, in using for example, a different direction rotating type 2 shaft screw etc., stirring may be 30-20mm or less as a dechlorination furnace 17 so that easily. Moreover, the smaller one of grinding particle size is desirable, if it is about 5mm, there will be no large burden in grinding power, and it is desirable. In addition, what is necessary is not to be referred to as 20mm or less, for example, just to be about 100mm as a dechlorination furnace 17, in using dechlorination furnaces, such as rotary kiln.

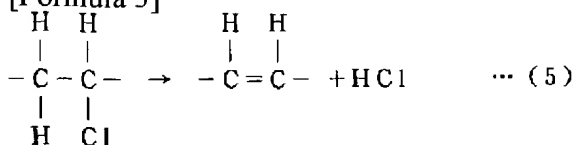
[0054] Although the grain-refining trash by which the preheating was carried out [above-mentioned] is pyrolyzed at the above-mentioned dechlorination furnace 16, as for pyrolysis conditions, it is desirable to consider as 300-450 degrees C. When it exceeds 450 degrees C, it is because the own decomposition of plastics advances and it is not desirable other than a dechlorination reaction, and on the other hand, at less than 300 degrees C, this has bad dechlorination efficiency and is both because it is not desirable. Although especially the heating approach of the above-mentioned dechlorination furnace 17 is not limited, it can hold an indirect heating method etc., for example other than a direct heating method. As for the gas to introduce, in the case of a direct heating method, it is desirable from the point of ignition prevention to circulate the gas by which an oxygen density (amount of O₂) does not contain low gas or oxygen. However, it is not this limitation when heating directly under nitrogen-gas-atmosphere mind. In addition, the quantity of gas flow of a direct heating method is large, and since the amount of the occurring exhaust gas increases, it is more desirable [the indirect heating approach] from the point of miniaturization of equipment.

[0055] Moreover, HCl decomposed in pyrolysis dechlorination Gas is HCl by carrying out reduced pressure processing of the inside of the above-mentioned dechlorination furnace, in order to prevent reacting with the metals contained in trash and carrying out the byproduction of the chlorine compound. The diffusion rate to the outside of the system of gas is made to increase. As conditions for reduced pressure, the degree of vacuum of 0.1kg/cm² or less is desirable.

[0056] Next, the weight percentage reduction in the pyrolysis of various plastics is shown in drawing 2 (the Mitsubishi Heavy Industries technical report, 10 (5) P787 (1973) reference). Generally, thermoplastics is softened and fused at about 120-230 degrees C, and is pyrolyzed at the elevated temperature after it. Moreover, heat-curing resin is pyrolyzed as it is with heating, without softening and fusing. There are a polyvinyl chloride (PVC) and a polyvinylidene chloride as plastics which contains chlorine among trash 11. If these chlorine content plastics is desorbed from a great portion of chlorine as a hydrogen chloride in an about 170 degrees C - 350 degrees C field and becomes an elevated temperature after that, the pyrolysis of other components will advance. The model of chlorine desorption is shown in the reaction formula (5) shown in following "*** 3."

[0057]

[Formula 3]



[0058] It is PVC (polyvinyl chloride) deHCl to drawing 3. A rate is shown. It is deHCl about 100% above this drawing 3 to 300 degrees C. Although carried out, the prolonged residence time for dozens of minutes is required. As mentioned above, plastics mixture starts a pyrolysis rapidly from about about 250 degrees C, and most disassembles it by about 500 degrees C.

[0059] Then, the pyrolysis rate of this invention of the hydrocarbon in plastics was as much as possible slow in the trash 13 which ground first and carried out grain refining, the pyrolysis rate of Chlorine Cl carried out decomposition processing only of the part for the chlorine in trash in the quick temperature field (about 260-360 degrees C), and chlorine is disassembled and separated at the rate of a high dechlorination beyond 80-90wt% of an initial chlorine content. In this case, although with an initial chlorine content [about 20 wt(s)% of] chlorine is contained in the residual solid-state which makes a hydrocarbon component a subject, this chlorine reacts with the alkali compound contained from the beginning in trash (above (1) refer to the reaction of - (4)), a chlorine compound is generated, and Chlorine Cl is fixed. In the above-mentioned rinse tank 24, it dissolves in water easily and the chloride generated at this time is separated with a solid-state.

[0060] In order to raise heat exchange engine performance of 15, such as ground plastics, as structure of the dechlorination furnace 17 of a pyrolysis, it is desirable to use what established the device which agitates and mixes mixture in the pyrolysis furnace 17. Thus, since it will be in the condition of always grinding what adheres to a wall surface by establishing stirring and a mixing mechanism in the above-mentioned dechlorination furnace 17, it can prevent also caulking to a wall surface to coincidence.

[0061] Moreover, when the container itself rotates like for example, a rotary-kiln mold as a dechlorination furnace 17, what has churning / mixing capacity may be used. Thus, when rotating trash for the whole dechlorination furnace, the same effectiveness as the above can be acquired.

[0062] Furthermore, it is also possible to circulate a heating medium in an outer case by dual structure, and to perform pyrolysis processing by indirect heating as structure of the dechlorination furnace 17.

[0063] The decomposition product 18 by which decomposition processing was carried out at the dechlorination furnace 17 is moved to an eliminator 21 with a melting condition, and is divided into exhaust gas 19 and the dechlorination solid 20 here. The exhaust gas 19 separated from the above-mentioned eliminator 21 carries out the perfect combustion of the gas containing the hydrogen chloride which burned at the secondary combustion furnace 27 and was generated by the pyrolysis. 750-1000 degrees C of combustion conditions of this secondary combustion furnace 27 are preferably made into 800-900 degrees C. This is because the decomposition product in gas re-condenses, or soot is generated, there is a problem from the point of the endurance of a furnace further and it is not desirable, even if disassembly of a hydrocarbon does not begin at less than 750 degrees C but it makes it decompose preferably exceeding 1000 degrees C on the other hand. Moreover, by considering as about 2 seconds at 850 degrees C, burn time can carry out full decomposition of the dioxin in exhaust gas, and is desirable.

[0064] The dechlorination solid 20 separated from the eliminator 21 is ground by the grinder 22. It is better for 1-5mm or less to cost 10mm or less preferably as a grinding particle size which makes detailed and is made detailed in order that this grinding may remove efficiently the chlorides (CaCl₂, CaCl₂, NaCl, KCl, etc.) contained inside the solid 20. In addition, since it becomes the shape of so-called sludge and efficient stirring becomes impossible when referred to as 1mm or less, it is not desirable.

[0065] By the above approach, both, in order that [which can perform demineralization processing of trash 11] a chloride may not carry out little deer survival into residue, pollution-free-ization of generating gas and residue becomes easy. Moreover, since the obtained slurry-like fuel 26 is dechlorinated in the occurring gas even when burning it with the coal fuel (CWM (Coal WaterMixture):

high concentration coal water slurry (for example, coal: 70%, water:30%)) which could handle in the condition as it is using migration means, such as a pump, for example, was suspended in water, harmful matter, such as dioxin, does not exist but serves as clean exhaust gas.

[0066] With the gestalt of [gestalt of the 2nd operation] book operation, after carrying out the pyrolysis dechlorination of the trash containing chlorine like the gestalt of the 1st operation, what was made to dissolve the mineral salt ghost which once rinsed and carried out the byproduction in water, and was separated is further dried with a drying furnace. Moreover, the solid fuel by which the gestalt which differs from a slurry-like fuel by desiccation was dechlorinated is obtained. Furthermore, in the gestalt of this operation, a deployment is aimed at for exhaust heat of the gas discharged from a secondary combustion furnace at a dechlorination process.

[0067] Drawing 4 is the outline of the manufacturing installation of the dechlorination fuel concerning the gestalt of the 2nd operation. The grinder 12 which carries out grain refining of the trash 11 containing chlorine to below predetermined size (for example, 20mm or less) as shown in drawing 4, The preheater 14 which heats the ground trash 13 beforehand, and the dechlorination furnace 17 which dechlorinates by heating the trash 15 by which the preheating was carried out, and by which grain refining was carried out in the condition that the steam concentration introduced from the steam installation means 16 is high, The eliminator 21 which divides the decomposition product 18 by which the pyrolysis was carried out at the above-mentioned dechlorination furnace into exhaust gas 19 and the dechlorinated solid 20, It consists of the grinder 22 which carries out pulverization (for example, 5mm or less) of the separated dechlorination solid 20 to below predetermined size, a rinse tank 24 from which the dechlorination solid 23 made detailed is rinsed, and mineral salt is removed, and a drying furnace 41 which dries the solid content after rinsing. The solid content dried with this drying furnace 41 can be used as a dechlorination solid fuel 42.

[0068] Moreover, with the gestalt of this operation, a heat exchanger 43 is formed between the secondary combustion furnace 27 and offgas treatment equipment 29, heat of combustion is collected, and the steam is generated with the steam generator 44 which has a water supply means. He introduces the steam 16 obtained here in the above-mentioned dechlorination furnace 17, and is trying to control generating of a chloride.

[0069] Moreover, with the gestalt of this operation, the heating gas 45 introduced separately is used as a heat source for heating of the dechlorination furnace 17. The gas after heating at this dechlorination furnace 17 is supplied via Rhine 46 and 47 as the heat source of a preheater 14, and a heat source of a drying furnace 41. In addition, offgas treatment of the exhaust gas 48 in a drying furnace 41 is carried out separately.

[0070] Both, in order that [which can perform dechlorination of trash 11 by the above approach] a chloride may not carry out little deer survival into residue, pollution-free-ization of generating gas and residue becomes easy. Moreover, the dechlorination solid fuel 42 is led to processes, such as the next gasification and oil-izing, and the organic substance (hydrocarbon) is oil-ization[gasification or]-processed. On the other hand, the gas which generates this since it is dechlorinated in burning as a fuel is harmless, and in order that a chloride may not carry out little deer survival into residue, pollution-free-ization of residue becomes easy. Moreover, by installation of a heat exchanger 43, while being able to use exhaust heat effectively, a steam is generated with the obtained heat, this steam can be used at the dechlorination furnace 17, and a deployment of heat is attained.

[0071] With the gestalt of [gestalt of the 3rd operation] book operation, like the gestalt of the 2nd operation, after carrying out the pyrolysis dechlorination of the trash containing chlorine, further what was made to dissolve the mineral salt ghost which once rinsed and carried out the byproduction in water, and was separated by making it dry with a drying furnace Although the dechlorinated solid fuel is obtained, the gestalten of use of exhaust heat of the gas discharged from a secondary combustion furnace differ.

[0072] Drawing 5 is the outline of the manufacturing installation of the dechlorination fuel concerning the gestalt of the 3rd operation. The grinder 12 which carries out grain refining of the trash 11 containing chlorine to below predetermined size (for example, 20mm or less) as shown in drawing 5,

The preheater 14 which heats the ground trash 13 beforehand, and the dechlorination furnace 17 which dechlorinates by heating the trash 15 by which the preheating was carried out, and by which grain refining was carried out in the condition that the steam concentration introduced from the steam installation means 16 is high, The eliminator 21 which divides the decomposition product 18 by which the pyrolysis was carried out at the above-mentioned dechlorination furnace into exhaust gas 19 and the dechlorinated solid 20, The grinder 22 which carries out pulverization (for example, 5mm or less) of the separated dechlorination solid 20 to below predetermined size, It consists of a rinse tank 24 from which the dechlorination solid 23 made detailed is rinsed, and mineral salt is removed, and a drying furnace 41 which dries the solid content after rinsing, and the solid content dried with the drying furnace 41 is obtained as a dechlorination fuel 42.

[0073] Moreover, with the gestalt of this operation, the heat exchanger 51 was formed between the secondary combustion furnace 27 and offgas treatment equipment 29, the air 53 introduced by the blower 52 was heated, and it uses as a heat source for heating of the dechlorination furnace 17 with the heating gas 54 introduced separately. In addition, the gas after heating at the dechlorination furnace 17 is supplied via Rhine 46 like the gestalt of the 2nd operation as the heat source of a preheater 14, and a heat source of a drying furnace 41. Moreover, the gas after heating at the dechlorination furnace 17 is supplied via Rhine 55 and 56 as the heat source of a preheater 14, and a heat source of a drying furnace 41. In addition, offgas treatment of the exhaust gas 48 in a drying furnace 41 is carried out separately.

[0074] the dechlorination fuel 42 after dechlorination (pyrolysis) is led to the next gasification, oil-izing, or a combustion process by the above approach -- having -- the organic substance (hydrocarbon) -- gasification and oil-izing -- or combustion processing is carried out. Since it is dechlorinated in the case of this combustion, the occurring gas is harmless, and in order that a chloride may not carry out little deer survival into residue, pollution-free-ization of residue becomes easy. Moreover, by installation of a heat exchanger 43, while being able to use exhaust heat effectively, a steam is generated with the obtained heat, this steam can be used at the dechlorination furnace 17, and a deployment of heat is attained.

[0075] With the gestalt of [gestalt of the 4th operation] book operation, like the gestalt of the 3rd operation, after carrying out the pyrolysis dechlorination of the trash containing chlorine, it once rinses. Although use of exhaust heat at a secondary combustion furnace is aimed at while obtaining the solid fuel which was made to dry further what was made to dissolve the mineral salt ghost which carried out the byproduction in water, and was separated with a drying furnace, and was dechlorinated It is mere trash to RDF (Rdfuse Derived Fuel: dust solidification fuel) about the object to process. It differs in that it used. In addition, since it is the same even if it uses RPF (waste plastic solid fuel), this invention explains the contents of this invention hereafter using RDF.

[0076] Drawing 6 is the outline of the manufacturing installation of the dechlorination fuel concerning the gestalt of the 4th operation. The dechlorination furnace 17 which dechlorinates by heating RDF (dust solidification fuel)61 containing chlorine in the condition that the steam concentration introduced by the steam installation means 16 is high as shown in drawing 6, The eliminator 21 which divides the decomposition product 18 by which the pyrolysis was carried out at the above-mentioned dechlorination furnace into exhaust gas 19 and the dechlorinated solid 20, The grinder 22 which carries out pulverization (for example, 5mm or less) of the separated dechlorination solid 20 to below predetermined size, While dechlorinating RDF (dust solidification fuel)61 which consists of a rinse tank 24 from which the dechlorination solid 23 made detailed is rinsed, and mineral salt is removed, and a drying furnace 41 which dries the solid content after rinsing, and contains chlorine The solid content dried with the drying furnace 41 is obtained as a dechlorination fuel 42.

[0077] Moreover, with the gestalt of this operation, a heat exchanger 51 is formed between the secondary combustion furnace 27 and offgas treatment equipment 29, the air 53 introduced by the blower 52 is heated, and the dechlorination furnace 17 is heated with the heating gas 54 introduced separately. In addition, the gas after heating at the dechlorination furnace 17 is supplied via Rhine 55 and 56 like the gestalt of the 2nd operation as the heat source of a preheater 14, and a heat source of a drying furnace 41.

[0078] According to the above approach, thermal decomposition processing of RDF (dust solidification fuel) 61 containing chlorine is carried out, the dechlorination fuel 42 after dechlorination (pyrolysis) is led to following gasification or a following combustion process, and the organic substance (hydrocarbon) is gasified or combustion processed. Since it is dechlorinated in the case of this combustion, the occurring gas is harmless, and in order that a chloride may not carry out little deer survival into residue, pollution-free-ization of residue becomes easy. Moreover, by installation of a heat exchanger 43, while being able to use exhaust heat effectively, the steam was generated with the obtained heat, this steam could be used at the dechlorination furnace 17, and generation of a mineral salt ghost is controlled with the deployment of heat.

[0079] The dechlorination approach is the same as that of the gestalt of the 2nd operation using RDF (dust solidification fuel) about the object processed like the gestalt of the 4th operation with the gestalt of [gestalt of the 5th operation] book operation.

[0080] Drawing 7 is the outline of the manufacturing installation of the dechlorination fuel concerning the gestalt of the 5th operation. The dechlorination furnace 17 which dechlorinates by heating RDF (dust solidification fuel) 61 containing chlorine in the condition that the steam concentration introduced by the steam installation means 16 is high as shown in drawing 7, The eliminator 21 which divides the decomposition product 18 by which the pyrolysis was carried out at the above-mentioned dechlorination furnace into exhaust gas 19 and the dechlorinated solid 20, The grinder 22 which carries out pulverization (for example, 5mm or less) of the separated dechlorination solid 20 to below predetermined size, While dechlorinating RDF (dust solidification fuel) 61 which consists of a rinse tank 24 from which the dechlorination solid 23 made detailed is rinsed, and mineral salt is removed, and a drying furnace 41 which dries the solid content after rinsing, and contains chlorine The solid content dried with the drying furnace 41 is obtained as a dechlorination fuel 42.

[0081] Moreover, a heat exchanger 43 is formed between the secondary combustion furnace 27 and offgas treatment equipment 29, heat of combustion is collected, and he generates a steam with a steam generator 44, and is trying to supply this steam to the dechlorination furnace 17 with the gestalt of this operation. Moreover, the conversive heat in a steam generator 44 is heating the dechlorination furnace 17 with the heating gas 45 introduced separately. Moreover, the gas after heating at the dechlorination furnace 17 is supplied via Rhine 46 as the heat source of a preheater 14, and a heat source of a drying furnace 41.

[0082] According to the above approach, thermal decomposition processing of RDF (dust solidification fuel) 61 containing chlorine is carried out, the dechlorination fuel 42 after dechlorination (pyrolysis) is led to following gasification or a following combustion process, and the organic substance (hydrocarbon) is gasified or combustion processed. Since it is dechlorinated in the case of this combustion, the occurring gas is harmless, and in order that a chloride may not carry out little deer survival into residue, pollution-free-ization of residue becomes easy.

[0083]

[Example] Although the suitable example which shows the effectiveness of this invention is explained hereafter, this invention is not limited to this.

[0084] It explains using the equipment which shows one example of this invention to drawing 4. As shown in drawing 4, the trash 11 containing the plastics containing chlorine, such as a polyvinyl chloride and a polyvinylidene chloride, is supplied to a grinder 12, and it grinds to about 20mm or less. The trash after the grinding concerned is supplied to a preheater 3, and it becomes hot beforehand at about 250-280 degrees C. The dechlorination furnace 17 is supplied, it is heated by 320-330 degrees C, the chlorine part in chlorine content plastics is decomposed actively, and the trash 15 by which the preheating was carried out is HCl. It becomes gas. It was separated by the eliminator 21 with the melting condition, and the gas (HCl is included) 19 which occurred by the pyrolysis was supplied to the secondary combustion furnace 27. The inflammable gas in exhaust gas 19 carried out combustion processing at 850 degrees C here. This combustion was made into 2 seconds. Furthermore, it is led to a heat exchanger 43 and combustion gas 28 is HCl with offgas treatment equipment 29. After separating and removing gas, it discharged as exhaust gas 30 and wastewater 31.

[0085] On the other hand, after the trash dechlorinated at the dechlorination furnace 17 separated exhaust gas with the eliminator 21, it turned into a solid 20, then, was supplied to the grinder 22, and was ground in detailed object about 5mm or less. The ground solid 23 is fed into a rinse tank 24, and the salts of fusibility are dissolved and separated by water. It dries with a drying furnace 41, and takes out as a dechlorination solid fuel 42, and the solid after rinsing is **. Then, gasification, oil-izing, and a combustion process are supplied. The heat of combustion generated at the secondary combustion furnace 27 was recovered by the heat exchanger (recovery temperature: 800 degrees C) 43 and the steam generator 44 as a steam, and the collected steam 16 was used as purge gas of the dechlorination furnace 17.

[0086] The case where the trash of the description of following "table 3" was dechlorinated on a raw material and conditions was made into examples 1-4 using the [examples 1-8] above-mentioned equipment. Consequently, the solid fuel with low residual dechlorination concentration was able to be manufactured. These results are shown in "Table 3." Moreover, the case where it dechlorinated under reduced pressure, having put the pressure on the dechlorination furnace 17 on the same conditions as examples 1-4 was made into examples 5-8. These results are shown in "Table 4." Here, the above-mentioned dechlorination furnace 17 used by this example is made into the indirect heating method by outer case heat carrier heating using the heating furnace with a 2 shaft impeller, and a dechlorination furnace processing scale is 300 (kg/d).

[0087] In addition, what did not perform a grinding process and a rinsing process for the solid 20 separated from the dechlorination furnace 17 was made into the examples 1-4 of a comparison. These results are shown in "Table 5."

[0088]

[Table 3]

廃棄物の性状及び運転結果

項 目	実施例 1	実施例 2	実施例 3	実施例 4
原料元素分析(wt%)				
C	66.23	66.23	66.23	46.45
H	9.37	9.37	9.37	7.21
O	9.80	9.80	9.80	32.01
N	0.31	0.31	0.31	1.00
Cl	3.78	3.78	3.78	2.41
灰 分	10.51	10.51	10.51	10.92
運転条件				
脱塩素温度 (°C)	328	301	385	346
二次燃焼温度 (°C)	815	821	853	812
固形物回収率 (%)	82.65	85.2	76.2	86.3
残留Cl濃度(wt%)	0.13	0.21	0.10	0.08

[Table 4]

廃棄物の性状及び運転結果（減圧処理）

項 目	実施例 5	実施例 6	実施例 7	実施例 8
原料元素分析(wt%)				
C	66.23	66.23	66.23	46.45
H	9.37	9.37	9.37	7.21
O	9.80	9.80	9.80	32.01
N	0.31	0.31	0.31	1.00
Cl	3.78	3.78	3.78	2.41
灰 分	10.51	10.51	10.51	10.92
運転条件				
脱塩素温度 (°C)	325	300	381	340
二次燃焼温度 (°C)	813	825	855	801
減圧圧力(atm)	0.07	0.07	0.06	0.07
固形物回収率 (%)	82.3	86.1	74.1	85.8
残留Cl濃度(wt%)	0.05	0.08	0.04	0.05

[Table 5]

廃棄物の性状及び運転結果（比較例）

項 目	比較例 1	比較例 2	比較例 3	比較例 4
原料元素分析(wt%)				
C	66.23	66.23	66.23	46.45
H	9.37	9.37	9.37	7.21
O	9.80	9.80	9.80	32.01
N	0.31	0.31	0.31	1.00
Cl	3.78	3.78	3.78	2.41
灰 分	10.51	10.51	10.51	10.92
運転条件				
脱塩素温度 (°C)	331	305	388	341
二次燃焼温度 (°C)	820	820	845	819
固形物回収率 (%)	83.1	84.8	75.7	85.8
残留Cl濃度(wt%)	0.85	0.91	0.78	0.81

[0089] In the case of this example, as shown in "Table 3 thru/or 5", although residual Cl concentration was very as low as 0.08 - 0.21 % of the weight, in the case of the example of a comparison, it was as high as 0.78 % of the weight or more, and the solid fuel with low residual chlorine concentration was able to be manufactured by this example to it. Moreover, it became clear by performing reduced pressure processing that the effectiveness of dechlorination improved sharply.

[0090] It dechlorinated by using as a raw material CSD (car shredder dust) which consists of a presentation of the [example 9] following "table 6." Here, the above-mentioned dechlorination furnace 17 used by this example is a rotary kiln mold pyrolysis furnace (bore 350x die length 4,100 (mm)), and a service condition is kiln inlet temperature. 420 degrees C and outlet temperature It could be 330 degrees C. In addition, mean flow-time in kiln It was referred to as 26min.

[0091]

[Table 6]

廃棄物の性状

項 目	実施例 5
原料元素分析(wt%)	
C	30.40
H	3.71
O	17.01
N	0.72
Cl	1.21
灰 分	46.95

[0092] According to this example, solid-fuel recovery is 73.5 (wt%) and the solid fuel of residual

chlorine concentration 0.21 (wt%) was able to be manufactured. Moreover, when the wall of a rotary kiln was observed, most of the welding of the plastics to a wall surface, caulking, etc. was not checked. [0093]

[Effect of the Invention] The dechlorination process which dechlorinates while pyrolyzing the trash containing chlorine according to "claim 1] of this invention, as explained above, Since it consists of a rinsing process which rinses this dechlorination solid made detailed the separation process which separates a dechlorination solid and cracked gas, and a detailed chemically-modified [which grinds and makes detailed the separated dechlorination solid] degree, and removes mineral salt In processing of trash, such as plastics mixture containing the plastics containing chlorine, such as a common contaminant and a vinyl chloride, and car shredder dust containing the plastics containing chlorine or a mineral constituent Harmful organochlorine compounds, such as dioxin, are not generated and the yield of trash, such as gasification residue and combustion ashes, can be controlled further. Moreover, a slurry-like fuel can be obtained and it can burn with CWM.

[0094] Since it has the grinding process which grinds and carries out grain refining of the trash which contains chlorine in the preceding paragraph of a dechlorination process in claim 1, and is used as grain-refining trash according to [claim 2], the area of a dechlorination reaction increases by grain refining of trash, and it becomes an efficient dechlorination reaction.

[0095] Since it is in claim 1 or 2 about the desiccation process which dries the dechlorination solid after rinsing after the above-mentioned rinsing process according to [claim 3], it can consider as a solid fuel in addition to a slurry-like fuel.

[0096] In claim 1 thru/or 3, in the above-mentioned dechlorination process, since a steam is introduced, although inorganic chlorination of the chlorine in a dechlorination reaction is prevented, according to [claim 4], it can do.

[0097] HCl decomposed since it processed under reduced pressure in the above-mentioned dechlorination process in claim 1 thru/or 4 according to [claim 5] It controls that gas reacts with the metals contained in trash, and carries out the byproduction of the inorganic chlorine compound, and is HCl. The diffusion rate to the outside of the system of gas can be made to increase.

[0098] Since it has the preheating process which heats beforehand the trash ground between the above-mentioned grinding process and the dechlorination process in claim 1 thru/or 5 according to [claim 6], melting-ization of plastics is promoted and the dechlorination reaction is made efficient.

[0099] Since it has the elevated-temperature combustion process which burns the cracked gas separated at the above-mentioned separation process at a secondary combustion furnace in claim 1 thru/or 6, and the offgas treatment process which removes the chlorine in exhaust gas according to [claim 7], while performing full disassembly of the organic chlorination object in exhaust gas etc., and decomposition processing of a hydrocarbon, he is trying to remove the hydrogen chloride in gas.

[0100] Since it has the heat exchange process which carries out heat exchange of the exhaust heat of gas between the above-mentioned elevated-temperature combustion process and an offgas treatment process in claim 1 thru/or 7 according to [claim 8], the heat generated at a dechlorination process can be used effectively.

[0101] Since according to [claim 9] the above-mentioned heat exchange process introduces air, it considers as heating air in claim 8 and this heating air is used for heating of the above-mentioned dechlorination process, the heat generated in a dechlorination process can be used efficiently.

[0102] According to [claim 10], it has the steamy generating process that the above-mentioned heat exchange process generates a steam in claim 8 using exhaust heat, and since the generated steam is used for heating of the above-mentioned dechlorination process, the heat generated in a dechlorination process can be used efficiently.

[0103] According to [claim 11], it has the steamy generating process that the above-mentioned heat exchange process generates a steam in claim 8 using exhaust heat, and since a heat process is used as a heat source of a desiccation process further beforehand while using the generated steam for the above-mentioned dechlorination process, the heat generated in a dechlorination process can be used efficiently.

[0104] According to [claim 12], in claim 1, since direct heat-treatment or indirect heating processing performs a pyrolysis process, trash is dechlorinated efficiently.

[0105] According to [claim 13], in claim 1, since decomposition temperature of a pyrolysis process is performed at 300-450 degrees C, trash is dechlorinated efficiently.

[0106] According to [claim 14], in claim 1, the area of a dechlorination reaction increases by grain refining of the trash which grinds grinding of the above-mentioned grinding process to 20mm or less, and it becomes an efficient dechlorination reaction.

[0107] According to [claim 15], in claim 1, since grinding of a detailed chemically-modified [above-mentioned] degree is ground to 10mm or less, after making it the diameter of detailed, the washing effectiveness in the rinsing processing case is raised.

[0108] According to [claim 16], in claim 6, since preheat temperature of the above-mentioned preheating process is made into 200-300 degrees C, melting-ization of plastics is promoted and the dechlorination reaction is made efficient.

[0109] Since according to [claim 17] combustion temperature of an elevated-temperature combustion process is made into 750-1000 degrees C and it burns at least 2 seconds or more in claim 7, the organic salt ghost in exhaust gas and full decomposition processing of heavy hydrocarbon can be performed.

[0110] Since according to [claim 18] an oxygen density circulates the gas which does not contain low gas or oxygen in claim 12 when a dechlorination process is direct heat-treatment, ignition in a furnace can be prevented.

[0111] Since according to the manufacture approach of the dechlorination fuel of [claim 19] it drains off water from the slurry object rinsed at the rinsing process of claim 1 and a slurry-like dechlorination fuel is obtained, the fuel of the shape of an acquired slurry can be burned with a coal fuel (CWM).

[0112] The dechlorination solid fuel obtained since according to [claim 20] it dried at the desiccation process of claim 3 and the dechlorination solidification fuel was obtained can be processed at processes, such as gasification, oil-izing, and combustion, and it becomes a new energy source, and since exhaust gas does not contain chlorine, it becomes a clean thing without generating of dioxin.

[0113] The grinder which grinds the trash containing chlorine according to the manufacturing installation of the dechlorination fuel of [claim 21], The dechlorination furnace which dechlorinates while heating and pyrolyzing this grain-refining trash, The eliminator which separates a dechlorination solid and cracked gas, and the grinder which grinds and makes detailed the separated dechlorination solid, It consists of a rinse tank from which the ground this dechlorination solid is rinsed and mineral salt is removed, and since a dechlorination fuel is obtained from the trash containing chlorine, a slurry-like fuel can be efficiently manufactured from trash.

[0114] It consists of the eliminator which separates the dechlorination furnace which according to the manufacturing installation of the dechlorination fuel of [claim 22] dechlorinates while pyrolyzing a refuse-derived fuel (RDF), and a dechlorination solid and cracked gas, a grinder which makes detailed the separated dechlorination solid, and a rinse tank from which the this ground dechlorination solid is rinsed and mineral salt is removed, and the fuel of the shape of a slurry dechlorinated from the refuse-derived fuel (RDF) containing chlorine can be manufactured efficiently.

[0115] Since a dechlorination solid fuel is obtained from the trash which has the desiccation process which dries the dechlorination solid after rinsing after the above-mentioned rinsing process in claim 21 or 22, and contains chlorine according to [claim 23], a dechlorination solid fuel can be efficiently manufactured from trash.

[0116] According to [claim 24], in claim 21 or 22, since the steam installation means was formed in the dechlorination furnace, although inorganic chlorination of the chlorine in a dechlorination reaction is prevented, it can do.

[0117] HCl decomposed since a reduced pressure means to decompress the inside of a dechlorination furnace was established in claim 21 or 22 according to [claim 25] It reacts with the metals contained in the trash of gas, the byproduction of a chlorine inorganic compound is controlled, and it is HCl. The diffusion rate to the outside of the system of gas can be made to increase.

[0118] According to [claim 26], in claim 21 or 22, since stirring of the interior of a furnace of the

dechlorination furnace itself is enabled [pivotable or], a dechlorination reaction can be performed efficiently.

[Translation done.]